

PROCEEDINGS OF LEARNED SOCIETIES.

ROYAL SOCIETY.

June 21, 1866.—Lieut.-General Sabine, President, in the Chair.

“On the Structure of the Optic Lobes of the Cuttle-fish.” By J. Lockhart Clarke, F.R.S.

The brain of the Cuttle-fish consists of several ganglia closely aggregated around the upper part of the œsophagus. The foremost or pharyngeal ganglion, which is much the smallest, is bilobed and somewhat quadrangular. The next is a large bilobed ganglion which forms the roof of the canal for the œsophagus. Beneath the œsophagus is another large and broad mass, which is connected on each side with the supra-œsophageal masses by bands that complete the œsophageal ring.

From each side of the cephalic masses springs a thick optic peduncle which ends in the optic lobe. Each optic lobe is larger than all the other cerebral masses taken together, and has a striking resemblance in shape to the human kidney. It is completely enveloped in a thick layer of optic nerves disposed in flattened bands which issue from all parts of its substance and proceed to the back of the eye in a fan-like expansion, the upper and lower bands crossing each other in their course. The substance of each lobe consists of two distinct portions, which differ from each other entirely in appearance. The outer portion resembles a very thin rind or shell, is extremely delicate, and very easily torn from the central substance which it encloses. It consists of three concentric layers—an external dark layer, an internal dark layer, and a middle pale and broader layer containing thin and concentric bands of fibres.

The first or outer layer consists of a multitude of nuclei and a few small nucleated cells, with which filaments of the optic nerves are connected. The second or middle layer is composed entirely of fine nerve-fibres which form two sets—one vertical, and the other horizontal. The vertical fibres issue at the under surface of the first layer from the network which its nuclei form with the fibres of the optic nerves. Some are continuous with the horizontal fibres, but the majority continue downward across them to the third or inner layer. At the junction of these two layers is a row of nucleated cells which send thin processes in different directions, and with which some of the nerve-fibres are connected. The third or inner layer is composed entirely of closely aggregated nuclei, which are joined together in a network by the fibres which issue from the under surface of the middle layer.

The cortical substance, consisting of these three layers, forms only a very small portion of the optic lobe. Out of the nuclear network of the inner layer fine nerve-fibres descend into the body of the lobe which it encloses. At first these fibres are vertical, parallel, and arranged in uniform series, with scattered nuclei between them; but

as they descend to the centre of the lobe, they diverge more and more, and cross each other to form a plexus, first with oval and then with broader meshes, in which the nuclei and nucleated cells are collected into groups of corresponding shape and size.

From the plexus at the inner side of the lobe bundles converge from all parts to form the lower half of the peduncle, the upper part of which consists of masses of small nuclei, and gives attachment, by a short pedicle, to a small tubercle. This tubercle consists of closely aggregated nuclei connected by fibres which converge to its neck and escape into the peduncle of the optic lobe.

After concluding his description of the optic lobes, the author gives a short account of the structure and connexions of the remaining cerebral ganglia of the Cuttle-fish, with the view of determining their homologies.

From the nature of the parts which it supplies, the foremost or pharyngeal ganglion would seem to combine the function of the centres which give origin to the trigeminal, the olfactory, and the gustatory nerves in the vertebrata. The second bilobed ganglion appears to correspond partly to the cerebral lobes and partly to the cerebellum of fishes. The posterior portion of the subœsophageal mass is the analogue of the medulla oblongata; while the anterior portion may be regarded as the spinal cord concentrated below the œsophagus and in the neighbourhood of the feet, which derive all their nerves from that source.

MISCELLANEOUS.

The "Monde de la Mer."

[To Dr. J. E. Gray, F.R.S. &c.]

MY DEAR SIR,—I have just returned from a visit to the "Monde de la Mer," a noble aquarium opened to the public, at a charge of two francs per head, within the last week, on the Boulevard Montmartre. It is arranged as a large grotto, with cement stalactites, and the light almost entirely comes through the glass front of the aquaria.

There are no less than thirteen aquaria, with glass fronts, about 15 feet long, 4 feet deep; and there are glass facings to brick-and-cement tanks 5 or 6 feet wide. These thirteen are for salt water alone; but there are others for fresh water, and two little ponds, 10 or 12 feet across. The aquaria are lit by gaslights placed above, which light up in the most efficient manner the interior, and show every fish most perfectly.

There appears to be no confervoid growth; and doubtless the gaslight is unfavourable to such vegetation, but gives an illumination more resembling the natural condition in deep water.

A gas-engine is employed to change the water, which continually runs to a tank below, and is pumped back, the jet being thrown